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TRANSMITTAL LETTER
APPEAL BRIEF

Applicant	:	Terry L. Gilton
App. No	:	10/666,586
Filed	:	September 18, 2003
For	:	PARTICLE DETECTION METHOD
Examiner	:	Sang H. Nguyen
Art Unit	:	2886

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APPEAL BRIEF UNDER 37 C.F.R. 41.37

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Confirmation No.	:	9170

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the Notice of Appeal filed May 31, 2007, Applicant submits this Appeal Brief, which is timely filed by July 31, 2007.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is Micron Technologies, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences for this application.

III. STATUS OF CLAIMS

Claims 1–24 stand rejected. Claims 25–51 have been canceled. Claims 1–24 are appealed.

IV. STATUS OF AMENDMENTS

No amendments were filed after the final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

None of the appealed claims is a means- or step-plus-function claim.

Claim 1 is the only independent claim on appeal and provides a method for detecting a particle on a substrate used in the fabrication of an integrated device. As discussed in the specification, particle contamination on such substrates can result in complete failure of a device manufactured thereon. *See, e.g.*, Specification at 1, ll. 10–11 (¶ **[0002]**). Some types of particle contamination are more problematic than others, for example, copper, nickel, and iron particles. *See, e.g.*, Specification at 1, ll. 13–19 (¶ **[0002]**). In particular, some of these types of particles catalyze the polymerization of selected monomers, thereby coating the particles with a polymer, making the particles larger and easier to detect using a particle counter. *See, e.g.*, Specification at 1, ll. 24–26 (¶ **[0004]**).

Claim 1 provides a method for detecting such particles. The substrate is contacted with a monomer, the polymerization of which is catalyzed by a particle. *See e.g.*, Specification at 4, ll. 2–3 (¶ **[0017]**); 6, ll. 25–26 (¶ **[0027]**); FIG. **1**, step **110**. As discussed above, contaminant particles on the wafer that catalyze the polymerization of the monomer become larger due to polymer growth on these particles, and hence, easier to detect. *See, e.g.*, Specification at 4, ll. 11–

13 (¶ **[0017]**); FIGS. **3A** and **3B**. The particles of claim 1 are detected using a particle counter. *See e.g.*, Specification at 4, ll. 7–13 (¶ **[0017]**); FIG. **1**, step **120**.

Claims 2–24 are directly or indirectly dependent on claim 1.

Claims 2–6 provide additional characteristics of the particle detector in the detection step **120** (FIG. **1**). Claim 2 recites that the particle counter detects the number of particles, sizes of the particles, positions of the particles, and/or combinations thereof. *See, e.g.*, Specification at 4, ll. 9–10 (¶ **[0017]**). Claim 3 recites that the particle counter is capable of detecting particles on both sides of the substrate without unmounting the substrate. *See, e.g.*, Specification at 6, ll. 15–17 (¶ **[0025]**). Claims 4 recites that the particle counter detects particles optically. *See e.g.*, Specification at 5, l. 3 (¶ **[0019]**); 6, ll. 12–13 (¶ **[0025]**). Claim 5 recites that the particle counter is a laser scanner. *See, e.g.*, Specification at 2, ll. 27–28 (¶ **[0008]**). Claim 6 recites that particle counter detects a property selected from the group consisting of absorbance, fluorescence, reflectance, refractive index, and polarization. *See, e.g.*, Specification at 6, ll. 17–19 (¶ **[0025]**).

Claims 7–10 provide for identifying the composition of the detected particle. Claim 7 recites that a composition of the particle is identified. *See, e.g.*, Specification at 4, ll. 16–17 (¶ **[0018]**). Claim 8 is dependent on claim 7 and recites that the composition of the particle is identified by the polymerization rate of the monomer. *See, e.g.*, Specification at 4, ll. 17–19 (¶ **[0018]**). Claim 9 depends on claim 8 and recites that the selected monomer is polymerized by a plurality of particle types. *See e.g.*, Specification at 3, ll. 3–4 (¶ **[0010]**); 5, ll. 23–27 (¶ **[0022]**). Claim 10 depends on claim 8 and provides for additional cycles of the detection method in a step **130** (FIG. **1**) by repeating the contacting **110** (FIG. **1**) and detecting steps **120** (FIG. **1**). *See, e.g.*, Specification at 4, ll. 22–25 (¶ **[0018]**).

Claims 11–13 provide for contacting the substrate with a plurality of monomers, such as in the contacting step **110** (FIG. **1**), for example. Claim 11 recites that the substrate is contacted with a plurality of monomers. *See, e.g.*, Specification at 5, ll. 26–28 (¶ **[0019]**). Claim 12 recites that the plurality of monomers contacts the substrate simultaneously. *See, e.g.*, Specification at 5,

ll. 28–29 (¶ **[0019]**). Claim 13 recites that the plurality of monomers contacts the substrate sequentially. *Id.*

Claims 14 and 15 provide additional characteristic of the particle to be detected. Claim 14 recites that the particle is a metal. *See, e.g.*, Specification at 6, ll. 20–21 (¶ **[0026]**). Claim 15 recites that the metal is copper. *See, e.g.*, Specification at 6, ll. 22–24 (¶ **[0026]**).

Claims 16 and 17 provide additional characteristics of the substrate on which the particle is to be detected. Claim 16 recites that the substrate comprises silicon. *See, e.g.*, Specification at 6, ll. 7–9 (¶ **[0024]**). Claim 17 recites that the substrate comprises a single crystal silicon wafer. *See, e.g.*, Specification at 6, ll. 9–11 (¶ **[0024]**).

Claims 18–21 provide additional characteristics of the monomer used in the contacting step **110** (FIG. **1**). Claim 18 recites that the monomer is in a vapor phase. *See e.g.*, Specification at 7, l. 7 (¶ **[0029]**). Claim 19 recites that the monomer is an alkene. *See e.g.*, Specification at 10, ll. 28–29 (¶ **[0042]**). Claim 20 recites that the alkene is selected from the group consisting of styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and acrylonitrile. *See e.g.*, Specification at 10, l. 29–11, l. 4 (¶ **[0042]**); 3, ll. 6–8 (¶ **[0011]**). Claim 21 recites that the monomer is aniline or thiophene. *See e.g.*, Specification at 14, l. 6–15, l. 13 (¶¶ **[0053]–[0054]**).

Claims 22 and 23 provide for the addition of a polymerization initiator, such as in the contacting step **110** (FIG. **1**). Claim 22 recites an initiator. *See e.g.*, Specification at 8, ll. 16–17 (¶ **[0034]**). Claim 23 recites that the initiator is benzyl bromide. *See e.g.*, Specification at 11, ll. 17–22 (¶ **[0045]); **15, ll. 16–18 (¶ **[0058]**).

Claim 24 recites that the substrate is irradiated with electromagnetic radiation. *See e.g.*, Specification at 8, ll. 10–11 (¶ **[0033]**).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appealed claims 1, 6, 11–13, and 24 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,646,243 (Pirrung).

(A) Regarding claim 1, the Examiner states that Pirrung anticipates under 35 U.S.C. § 102(b) by disclosing in FIG. **9** and in the abstract, a method and device for detecting a particle on a substrate (**112**, FIG. **9**), the method comprising:

> contacting the integrated device substrate **112** (FIG. **8A**) with a monomer (col. 3, ll. 7–11 and 58–65; col. 5, l. 65 to col. 6, l. 9), wherein the particle catalyzes the polymerization of the monomer (col. 7, ll. 8–17, col. 10, ll. 51–67) is disposed on the substrate **112** (FIG. **8A**), and
>
> detecting the particle using a particle counter (*i.e.*, a photon counter **216** (FIG. **9**) coupled to a computer **204** (FIG. **9**), *see* col. 3, l. 66 to col. 4, l. 16; col. 20, l. 15 to col. 21, l. 15; col. 24, ll. 32–63). *See* FIGS. **1**–**20**.

(B) Regarding claim 6, the Examiner states that Pirrung states that Pirrung anticipates under 35 U.S.C. § 102(b) by disclosing a particle counter **216** and **204** (FIG. **9**) that detects a property selected from the group consisting of absorbance, fluorescence, reflectance, refractive index, and polarization (col. 3, l. 66 to col. 4, l. 16; col. 16, ll. 15–24 & 53–60).

(C) Regarding claim 11, the Examiner states that Pirrung states that Pirrung anticipates under 35 U.S.C. § 102(b) by disclosing a substrate **112** (FIG. **9**) contacted with plurality of monomers (*i.e.*, a first monomer and second monomer) (col. 3, ll. 1–24).

(D) Regarding claims 12–13, the Examiner states that Pirrung states that Pirrung anticipates under 35 U.S.C. § 102(b) by disclosing a plurality of monomers (*i.e.*, a first monomer and second monomer) (col. 3, ll. 1–24] contacting the substrate **112** (FIG. **9**) simultaneously or/and sequentially (col. 8, l. 62 to col. 9, l. 55).

(E) Regarding claim 24, the Examiner states that Pirrung states that Pirrung anticipates under 35 U.S.C. § 102(b) by disclosing a substrate **112** (FIG. **9**) is irradiated with electromagnetic radiation (col. 7, ll. 35–53).

(F) Claims 2, 4, and 5 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 4,967,095 (Berger). The Examiner states that Pirrung discloses all of features of claim 1, except that: the particle counter detects a property selected from the group consisting of number of particles, sizes of the particles, positions of the particles,

and combinations thereof; and the particle counter is a laser scanner that detects particles optically. The Examiner states that Berger discloses a method of detecting particles on a surface comprising a particle counter (*i.e.*, a particle detector) (col. 1, ll. 46–50; col. 2, ll. 43–45) that detects a property selected from the group consisting of number of particles (col. 6, l. 55), sizes of the particles, positions of the particles, and combinations thereof (col. 6, ll. 12–19 & 45–48); and that the particle counter is a laser scanner that detects particles optically (col. 5, l. 10). The Examiner states that it would have been obvious to combine the method of Pirrung with the particle counter of Berger for detecting particles on a surface with more accuracy.

Claims 3 and 14–17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 4,965,454 (Yamauchi).

(G) Regarding claim 3, the Examiner states that Pirrung discloses all of features of claim 1, except that the particle counter is capable of detecting particles on both sides of a substrate without unmounting the substrate. The Examiner states that Yamauchi discloses a method of detecting particle, using a particle counter – comprising a laser **14** (FIG. **1**)), scanner mirrors **20***a* and **20***b* (FIG. **1**), and two detectors **203***a* and **203***b* (FIG. **1**) – is capable of detecting particles **5***a* and **5***b* (FIG. **1**) on both sides of a substrate **102** (FIG. **1**) without unmounting the substrate. The Examiner states that it would have been obvious to combine the method of Pirrung with the particle counter of Yamauchi for detecting particles on both surfaces of a substrate with more accuracy.

(H) Regarding claim 14, the Examiner states that Pirrung discloses all of features of claim 1, except that the particle is a metal. The Examiner states that Yamauchi teaches detecting a metal particle (col. 1, ll. 50–61), and that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung with a metal particle as disclosed in Yamauchi for detecting particles on both surfaces of a substrate with more accuracy.

(I) Regarding claim 15, the Examiner states that Pirrung and Yamauchi together disclose all of features of claim 14, except that the metal is copper, and that claim 15 is obvious over the combination. The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to modify the method of Pirrung and Yamauchi using copper as the metal is copper

because selecting a known material based on its suitability for an intended use is a matter of obvious design choice, citing *In re Leshin*, 125 U.S.P.Q. 416 (C.C.P.A., 1960).

(J) Regarding claims 16–17, the Examiner states that Pirrung discloses all of features of claim 1, except that the substrate is single crystal silicon wafer. The Examiner states that Yamauchi teaches a method for detecting particle on a single crystal silicon wafer substrate (col. 1, ll. 5–10). The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung with the single crystal silicon wafer substrate disclosed in Yamauchi for detecting particles on both surfaces of a substrate with more accuracy.

Claims 7–10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 6,485,703 (Coté).[1]

(K) Regarding claims 7–8 the Examiner states that Pirrung discloses all of features of claim 1, except that the composition of the particle is identified by the polymerization rate of the monomer. The Examiner states that Coté discloses identifying the composition of a particle by a polymerization rate of a monomer (col. 6, ll. 41–60; col. 13, l. 62 to col. 14, l. 26; *see* FIGS. **1**, **8**–**9**). The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung with identifying the composition of a particle by a polymerization rate of a monomer as disclosed by Coté for detecting particles on a surface with more accuracy.

(L) Regarding claims 9–10, the Examiner states that Pirrung discloses all of features of claim 1, except that the monomer is polymerized by a plurality of particle types. However, The Examiner states that Coté discloses a monomer polymerized by a plurality of particle types (col. 24, ll. 24–67). The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung a monomer polymerized by a plurality of particle types as disclosed by Coté for detecting particles on a surface with more accuracy.

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[1] The Office Action refers to the reference as "Tote et al (U.S. Patent No. 4,965,454); however, U.S. Patent No. 4,965,454 is Yamauchi, discussed above. The form PTO-892 lists as a reference cited, "Cote et al. (U.S. Patent No. 6,485,703)," which is not otherwise referenced in the Office Action. In this brief, "Tote" is taken to refer to the Coté reference.

(M) Claim 18 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 7,056,666 (Dower). The Examiner states that Pirrung discloses all of features of claim 1, except that the monomer is in a vapor phase. The Examiner states that Dower a monomer in a vapor phase (col. 8, l. 65 to col. 9, l. 20). The Examiner states that it would have been obvious to combine the method of Pirrung a monomer in a vapor phase as disclosed in Dower for detecting particles on both of the substrate surfaces with more accuracy.

Claim 19–23 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 5,100,762 (Tanaka).

(N) Regarding claims 19–20, the Examiner states that Pirrung discloses all of features of claim 1, except that: the monomer is an alkene; and the alkene is selected from the group consisting of styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and acrylonitrile. The Examiner states that Tanaka discloses an alkene monomer, and an alkene selected from the group consisting of styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and acrylonitrile (col. 12, ll. 4–32). The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine method of Pirrung with an alkene monomer, and an alkene selected from the group consisting of styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and acrylonitrile as disclosed in Tanaka for the purpose of good capacity to form homogeneous films and high sensitivities at a specific wavelengths, allowing efficient development.

(O) Regarding claim 21, the Examiner states that Pirrung and Tanaka together disclose all of features of claim 21, except that the monomer is selected from the group consisting of aniline and thiophene. The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung and Tanaka with a monomer selected from the group consisting of aniline and thiophene because selecting a known material based on its suitability for an intended use is a matter of obvious design choice, citing *In re Leshin*, 125 U.S.P.Q. 416 (C.C.P.A., 1960).

(P) Regarding claim 22, the Examiner states that Pirrung discloses all of features of claim 22, except for an initiator. The Examiner states that Tanaka discloses an initiator (col. 12, l. 65 to col. 13, l. 7). The Examiner states that it would have been obvious under 35 U.S.C. §

103(a) to combine the method of Pirrung with an initiator as disclosed in Tanaka for the purpose of good capacity to form homogeneous films and high sensitivities at a specific wavelength, allowing efficient development.

(Q) Regarding claim 23, the Examiner states that Pirrung and Tanaka discloses all of features of claim 23, except that the initiator is benzyl bromide. The Examiner states that it would have been obvious under 35 U.S.C. § 103(a) to combine the method of Pirrung and Tanaka with benzyl bromide as an initiator because selecting a known material based on its suitability for an intended use is a matter of obvious design choice, citing *In re Leshin*, 125 U.S.P.Q. 416 (C.C.P.A., 1960).

VII. ARGUMENT

A. Claim 1 Is Not Anticipated by Pirrung Because Pirrung Does Not Disclose Every Feature of Claim 1

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

1. The Cited Portions of Pirrung Disclose the Synthesis of Receptors on Substrate and Use of the Receptors for Detecting Fluorescently Labeled Analytes Bound to the Receptors

Because the Examiner relies on the devices illustrated in FIGS. **8A** and **9** of Pirrung and their associated descriptions, a brief description of relied-upon devices and methods follows. FIG. **8A** illustrates a device **100** for synthesizing polymeric receptors on a substrate **112**. Pirrung at col. 15, ll. 26–29. A receptor is a compound that has an affinity for a given ligand. Pirrung at col. 6, ll. 28–29. In the description of the device illustrated in FIG. **8A**, the polymeric receptor is a polymer of amino acids. Pirrung at col. 17, ll. 45–48. A polymer of amino acids of the type described therein is also known as a "polypeptide." Pirrung at col. 6, ll. 10–12. A type of polypeptide is referred to as a "catalytic polypeptide," which catalyze chemical reactions "involving the conversion of one or more reactants to one or more products. Such polypeptides

generally include a binding site specific for at least one reactant or reaction intermediate." Pirrung at col. 7, ll. 8–15. There is no further discussion of catalytic polypeptides in Pirrung.

Receptors are synthesized on a substrate **112** using the device **100** illustrated in FIG. **8A** as follows. A substrate **112** is mounted with its bottom surface **114**, on which is disposed a layer comprising a photolabile or photoremovable protective group, above a cavity **104**. Pirrung at col. 15, ll. 41–44. Selected first locations of the bottom surface **114** are deprotected by illumination by a light source **124** through a mask **128**. Pirrung at col. 16, ll. 61–63. A solution of a first protected monomer is circulated in the cavity **104**, thereby contacting the deprotected first locations. Pirrung at col. 17, ll. 4–9. Coupling reagents are also present, which chemically couple the carboxyl group of the monomer to the deprotected amino group at the selected first locations. Pirrung at col. 17, ll. 9–15, ll. 45–48. The reagents disclosed in TABLES 2 and 3 are stoichiometric coupling reagents (HOBT, DIEA, BOP). Pirrung at col. 17, ll. 16–44. The mask **128** is then used to deprotect second locations on the substrate **112** for stoichiometric reaction with a second protected monomer, and the process continued to obtain the desired polypeptide sequence(s). Pirrung at 17, ll. 53–63.

On a microscopic scale, a polymeric receptor is synthesized on the substrate **112** as illustrated schematically in FIGS. **1–7**. A surface **4** of the substrate **2** is bound to a linker molecule **6**, to which is attached a photolabile protective group, as illustrated in FIG. **1**. Pirrung at col. 10, ll. 52–54; col. 11, ll. 34–37; col. 12, ll. 15–18. Exposing a selected region of the protected linker **6** to radiation suitable for deprotecting the linker **6** forms regions **10*a*** and **10*b*** of an exposed reactive functional group, which is indicated by vertical hatching. Pirrung at col. 13, ll. 5–8. As illustrated in FIG. **2**, on contacting the deprotected linker **10*a*** and **10*b*** to a protected monomer *A*, the protected monomer reacts with the reactive functional group on the linker to provide regions **12*a*** and **12*b*** of the monomer *A* bound to the linker **6**. Pirrung at col. 14, ll. 24–30. Additional monomers are added similarly, either at the same region or a different region, to form the desired monomer sequence or sequences, as illustrated in FIGS. **3–7**. Pirrung at col. 14, ll. 37–60. Pirrung does not disclose that the addition of each monomer is a catalytic process. In

the examples provided in the specification, the monomers are added using stoichiometric reactions, not catalytic reactions. Pirrung at col. 22, ll. 29–35 ("Active esters (pentafluorophenyl, OBt, etc.) of gly and phe protected at the amino group with NVOC are prepared as reagents."); col. 26, ll. 35–50.

FIG. **9** illustrates a device for detecting fluorescently labeled receptors formed on the substrate **112** as described above. Pirrung at col. 20, ll. 16–17. The substrate is mounted on an X–Y translation table **202**, which can be computer controlled. Pirrung at col. 20, ll. 17–30. A microscope **206** is positioned above the substrate **112**. Pirrung at col. 20, ll. 31–32. The microscope **206** directs light from a laser **210** onto the substrate **112**, as well as directing fluorescent light from the substrate **112** to a photomultiplier tube **212**, which detects the fluorescent light. Pirrung at col. 20, ll. 33–55.

Pirrung also discloses a test of the detection capability of the device illustrated in FIG. **9** using commercially available, standardized fluorecscein-labeled beads. Pirrung at col. 24, ll. 33–37. A bead is placed on the illumination field, presumably, the X–Y translation table **202**, illuminated with the laser **210**, and the fluorescence detected. Pirrung at col. 24, ll. 38–50.

Pirrung does not explicitly describe the use of the device illustrated in FIG. **9** in detecting binding to receptors disposed on the substrate **112**, but does describe the detection of binding to a substrate-bound receptor using Herz antibody and fluorescein-labeled goat anti-mouse antibody, which could be performed on this device. Pirrung at col. 27, l. 38 to col. 28, l. 22.

2. Pirrung Does Not Disclose "A Particle That Catalyzes the Polymerization of the Monomer"

Claim 1 recites in part "a particle that catalyzes the polymerization of the monomer." Pirrung does not disclose a particle that *catalyzes the polymerization* of a monomer. The Examiner relies on col. 7, ll. 8–17 as disclosing this feature. The cited portion of the specification describes catalytic polypeptides, which appear to be a type of receptor useful in screening a polymer for biological activity. *See, e.g.* Pirrung at col. 3, ll. 33–36 ("To screen for biological activity, the substrate is exposed to one or more *receptors* such as antibody whole cells, receptors on vesicles, lipids, or any one of a variety of other receptors.") (emphasis added). The catalytic

polypeptides "are capable of promoting a chemical reaction involving the conversion of one or more reactants to one or more products." Pirrung at col. 7, ll. 8–11. Pirrung does *not* disclose that the catalytic polypeptide "*catalyzes the polymerization of a monomer*." Pirrung also does not disclose that the catalytic polypeptide is a particle. Accordingly, the cited portion does not disclose a particle that catalyzes the polymerization of a monomer.

The Examiner characterizes col. 10, ll. 51–67 of Pirrung as disclosing a particle that catalyzes a monomer. The cited portion is the beginning of a section (Pirrung at col. 10, l. 51 to col. 15, l. 24) describing the synthesis of *substrate-bound* polymer chains, for example, as illustrated in FIG. **1**, illustrating a substrate **2** on which a layer of linker molecules **6** is disposed, and to which monomers **12***a* and **12***b* are bonded (FIG. **2**). These polymer chains are synthesized *stoichiometrically*, not catalytically, as discussed above. No where does Pirrung does not disclose a catalytic polymerization reaction. Consequently, the cited portion also does not disclose a particle that catalyzes the polymerization of a monomer.

3. Pirrung Does Not Disclose "Detecting the Particle Using a Particle Counter"

Claim 1 also recites in part "detecting the particle using a particle counter." Pirrung also does not disclose this feature. The Examiner relies on FIG. **9**. According to the specification, "FIG. **9** illustrates a fluorescent detection device for detecting fluorescently labeled receptors on a substrate." Pirrung at col. 20, ll. 16–17. The portions of the specification cited by the Examiner are in accord. None of these portions discloses the detecting of a particle using a "particle counter" as recited in claim 1, to say nothing of detecting the particle that catalyzes the polymerization of a monomer. For example, both col. 3, l. 66 to col. 4 l. 16, and col. 20, l. 21 to col. 21, l. 15 describe detecting a fluorescently labeled receptor bound to one or more polymer sequences disposed on a surface of a substrate. Pirrung at col. 24, ll. 32–63 discloses the detection capability of the apparatus illustrated in FIG. **9** for quantitizing fluorescence, in this case, of fluorescein molecules disposed on standardized fluorescent beads. The cited portion does not disclose detecting beads, however. For example, there is no description of the output of the device in the presence of a bead versus in the absence of a bead. The bead serves simply a carrier for fluorescein molecules in this example. Certainly, one would not characterize the device is

detecting the X–Y translation table **202** on which the bead is disposed, or the substrate **112** on which the receptors are formed.

Pirrung also does not disclose a particle counter at all. For example, in the discussion of the fluorescein-labeled beads, Pirrung does not disclose counting any beads. The Examiner also refers to FIGS. **1–20**, every drawing in Pirrung, as disclosing "detecting the particle using a particle counter." None of the drawings appears to disclose a particle, the detection thereof, or a particle counter.

4. There Is No Identity of Invention Between Pirrung and Claim 1

Applicant further submits that Pirrung does not anticipate claim 1 because there is no identity of invention between Pirrung and claim 1. "Identity of invention is a question of fact, and one who seeks such a finding must show that each element of the claim in issue is found, either expressly or under principles of inherency, in a single prior art reference, or that the claimed invention was previously known or embodied *in a single prior art device or practice*." *Minnesota Min. & Mfg. v. Johnson & Johnson*, 976 F.2d 1559, 1565, 24 U.S.P.Q.2d 1321 (Fed. Cir. 1992) (emphasis added). M.P.E.P. 2131 is in accord: "The elements must be arranged as required by the claim." *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

Pirrung simply does not disclose the method recited in claim 1. Instead, the Examiner has assembled the features of claim 1 by picking and choosing from disparate elements in Pirrung. Such picking and choosing is improper. Otherwise, a dictionary would anticipate nearly any claim.

For example, the Examiner relies on col. 3, ll. 7–11, 58–65; and col. 5, l. 65 to col. 6, l. 9 as disclosing contacting a substrate with a monomer, and col. 7, ll. 8–17 and col. 10, ll. 51–67 as disclosing a particle that catalyzes the polymerization of the monomer. As discussed above, col. 3, 7–11 58–65; col. 5, l. 65 to col. 6, l. 9; and col. 10, ll. 51–67 are related to the synthesis of a *substrate-bound* polymer using a series of *stoichiometric* (*i.e.*, non-catalytic) reactions. In contrast, col. 7, ll. 8–17 discloses catalytic polypeptide receptors, which are not used in synthesizing the substrate-bound polymer. Consequently, Pirrung does not disclose "a single

prior art device or practice" for "contacting the substrate with a monomer, wherein the particle catalyzes the polymerization of the monomer."

The Examiner has not shown identity of invention in Pirrung between "contacting the substrate with a monomer, wherein a particle that catalyzes the polymerization of the monomer is disposed on the substrate" and "detecting the particle using a particle counter." As discussed above, for the "detecting the particle using a particle counter" feature, the Examiner relies on a method for measuring fluorescence, which is not related to the synthesis of the substrate-bound polymer.

Thus, in addition to failing to teach each and every feature of the claims, the rejection is also an inappropriate attempt to combine disparate disclosures within Pirrung by treatment under the rubric of "anticipation," despite the fact that the reference does not teach or suggest all of the claimed elements arranged "in the manner claimed." For at least these reasons, Pirrung does not anticipate claim 1. Because claims 6, 11–13, and 24 are dependent on claim 1 and recite additional features, these claims are also not anticipated by Pirrung for at least the same reasons.

B. Claim Rejections Under 35 U.S.C. § 103 Are Improper Because Pirrung Is Not Analogous Art

Each of the rejections under 35 U.S.C. § 103 rely on Pirrung as the primary reference. Pirrung is not analogous art, and accordingly, the rejections are improper for at least this reason. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); M.P.E.P. 2141.01(a).

Pirrung is not in the same field of endeavor as the pending claims. Claim 1 is directed to a method for detecting a particle on a substrate "used in the fabrication of an integrated device." Pirrung discloses a "method and apparatus for preparation of a substrate containing a plurality of sequences" (Pirrung at Abstract), which is not in the field of fabrication of an integrated device.

Pirrung is also not pertinent to the particular problem with which the inventor was concerned. Particle contamination in the manufacture of integrated devices is among the

problems identified in the present application. Specification at ¶ **[0002]** ("Particulate contaminants are undesirable in the fabrication of integrated devices."). Pirrung is directed to substrate-bound polymers, for example, polypeptides, which are useful in detecting analytes bound thereto. Accordingly, Pirrung is not pertinent to the manufacture of integrated devices, and is not analogous art. Indeed, Pirrung is not concerned with the detection of particles on a substrate at all – rather, *known* elements (linker molecules) are provided on the substrate and polymer chains synthesized non-catalytically thereon. The polymer chains themselves are also not detected. Rather, it is suggested that this substrate with *known* features bound thereto is useful for binding elements (*e.g.*, antibodies, cells, lipids, *etc.*) of an analyte, and those bound elements are detected. Thus, Pirrung is not concerned with detection of the "particles" or anything else that is on the substrate or polymerized on the substrate. It is only after binding elements from analyte that a detection step is taken, and in that case it is the bound elements being detected, not the original "particles" or polymers formed thereon. Consequently, claim 1 is patentable over the cited references for at least this reason.

C. Claims 2, 4, and 5 Are Not Obvious Over Pirrung and Berger

Claims 2, 4, and 5 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 4,967,095 (Berger).

A *prima facie* rejection for obviousness requires at least: (1) a disclosure or suggestion of every element of the claim in the cited reference or references; and (2) a reasonable expectation of success. The reasonable expectation of success must be found in the cited references. *In re* Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). "Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, *it can be important to identify a reason* that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l v. Teleflex Inc.*, slip op. at 14–15, 550 U.S. ___ (2007) (emphasis added).

1. Pirrung and Berger Do Not Disclose or Suggest Every Element in Claims 2, 4, and 5

The Examiner relies on Berger only for disclosing a particle counter that detects a property selected from the group consisting of number of particles, sizes of the particles, positions of the particles; an optical particle counter; and a laser scanner particle counter. As discussed, Pirrung does not disclose or suggest every feature of claim 1, from which claims 2, 4, and 5 depend. Accordingly, the combination of Pirrung and Berger also do not disclose or suggest every feature recited in these claims.

2. The Examiner Has Not Provided a Proper Reason to Combine Pirrung and Berger

Moreover, the Examiner has not provided a proper reason to combine the Pirrung and Berger. The Examiner's purported reason is "for the purpose of detecting particles on the surface more accurately." As discussed above, Pirrung does not disclose or suggest detecting particles at all. Accordingly, one skilled in the art would have no reason to combine Pirrung with Berger.

D. Claims 3 and 14–17 Are Not Obvious Over Pirrung and Yamauchi

Claims 3 and 14–17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 4,965,454 (Yamauchi).

1. Pirrung and Yamauchi Do Not Disclose or Suggest Every Element in Claims 3 and 14–17

The Examiner relies on Yamauchi only for disclosing a particle counter that detects particles on both sides of a substrate; a metal particle; a copper particle; and silicon wafers. Because claims 3 and 14–17 are dependent on claim 1 and Pirrung does not disclose or suggest every feature recited in claim 1, Pirrung and Yamauchi do not disclose or suggest every feature recited in claims 3 and 14–17.

2. The Examiner Has Not Provided a Proper Reason to Combine Pirrung and Yamauchi

The Examiner's reason to combine the references is also improper. With respect to claims 3, 14, 16, and 17, the Examiner's stated reason is "for the purpose of detecting particles on both

of the surface[s of the] substrate [with] more accuracy." As discussed above, Pirrung does not disclose or suggest detecting particles. Furthermore, Pirrung does not disclose or suggest any interest in both sides of a substrate. Accordingly, one skilled in the art would have no reason to interrogate the backside of the substrate of Pirrung.

3. The Doctrine of Design Choice Does Not Apply

With respect to claim 17, the Examiner states that one skilled in the art would select a known material on the basis of suitability for the intended use as a matter of design choice, relying on *In re Leshin*, 125 U.S.P.Q. 416 (C.C.P.A., 1960). The Examiner's reliance on *In re Leshin* is misplaced. In *In re Leshin*, the court held that selecting a known plastic to make a container of a type made of plastics prior to the invention was obvious. In the present case, the Examiner is not applying any reference in which a particle catalyzes the polymerization of a monomer, let alone a copper particle. Moreover, the intended use of the present invention (detecting particles on a substrate) has no relationship to the intended use of the prior art combination. Accordingly, one skilled in the art would have no reason to select a copper particle.

E. Claims 7–10 Are Not Obvious Over Pirrung and Coté

Claims 7–10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 6,485,703 (Coté).

1. Pirrung and Coté Do Not Disclose or Suggest Every Element in Claims 7–10

The Examiner depends on Coté only for disclosing identifying a composition of a particle by the polymerization rate of a polymer, and a monomer polymerized by a plurality of particle types. Because claims 7–10 depend on claim 1 and Pirrung does not disclose or suggest every feature in claim 1, Pirrung and Coté also do not disclose or suggest every feature in claims 7–10.

Moreover, the portions of Coté cited by the Examiner do not appear to disclose either of the features cited by the Examiner. Coté appears to be directed to hydrogel particles useful for detecting an analyte. Coté at Abstract.

Cited col. 6, ll. 41–60 discloses a composition comprising a hydrogel and additional monomers. The cited passage does not discuss identifying a catalytic particle's composition by polymerization rate of a monomer, or even a polymerization rate. Cited col. 13, l. 62 to col. 14, l.

26 appears to disclose suitable sizes for hydrogel particles and suitable analytes, but also does not appear to be related to identifying a catalytic particle's composition by a polymerization rate. FIG. **1** is described as an optical system for fluorescence measurements. Coté at col. 15, ll. 31–32. In Example 1, the apparatus is described as a "commercial SPEX Fluorolog spectrometer." Coté at col. 38, l. 62. Example 1 does not disclose identifying a composition by a polymerization rate. FIG. **8** is described a method for patterning a hydrogel, and does not disclose identifying a catalytic particle's composition by a polymerization rate. Coté at col. 46, l. 59 to col. 47, l. 6. FIG. **9A** is described as illustrating a bench-top fluorescent unit useful for producing measurable changes in fluorescence intensity of polymer particles illustrated in FIG. **9B**. Coté at col. 47, l. 58 to col. 48, l. 4 (Example 3). Example 3 does not appear to be related to identifying a composition of a particle by its polymerization rate of a monomer.

Cited col. 24, ll. 24–67 appears to describe compositions of hydrogel particles for detecting different analytes as well as particle sizes. The cited portion does not disclose or suggest a monomer polymerized by a plurality of particle types.

2. The Examiner Has Not Provided a Proper Reason to Combine Pirrung and Coté

The Examiner's reason for combining the cited references is also improper. The Examiner's stated reason is "for the purpose of detecting particles on the surface with more accuracy." As discussed about, *neither* of the cited references discloses detecting particles, and accordingly, there would be no reason to combine the references for this purpose.

3. Coté Is Not Analogous Art

Moreover, Coté is not analogous art for the same reasons that Pirrung is not analogous art. Coté is directed to detecting biologically active analytes *in vivo*, while the pending claims are directed to a method for detecting a particle on a substrate used in the fabrication of an integrated device.

F. Claim 18 Is Not Obvious Over Pirrung and Dower

Claim 18 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of Dower (U.S. Patent No. 7,056,666).

1. Pirrung and Dower Do Not Disclose or Suggest Every Element in Claims 7–10

The Examiner relies on Dower only for disclosing a vapor phase monomer. Because claim 18 is dependent on claim 1 and Pirrung does not disclose or suggest every feature of claim 1, Pirrung and Dower also do not disclose or suggest every element recited in claim 18. Moreover, the cited portion of Dower (col. 8, l. 65 to col. 9, l. 20) does not disclose a vapor phase monomer. Instead Dower is directed to sequencing biological polymers. Dower at Abstract.

2. The Examiner Has Not Provided a Proper Reason to Combine Pirrung and Dower

The Examiner's purported reason to combine – "for the purpose of detecting particles on both of the surface substrate [with] more accuracy" – is also improper for at least the reason that claim 18 does not recite detecting particles on both sides of a substrate, and also fails because neither reference discloses detecting a particle on a substrate.

3. Dower Is Not Analogous Art

Furthermore, Dower, which is directed to sequencing biological polymers, is not analogous art for the same reasons as Pirrung.

G. Claims 19–23 Are Not Obvious Over Pirrung and Tanaka

Claims 19–23 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Pirrung in view of U.S. Patent No. 5,100,762 (Tanaka).

1. Pirrung and Tanaka Do Not Disclose or Suggest Every Element in Claims 7–10

The Examiner relies on Tanaka only for the disclosure alkene monomers. Because claims 19–23 are dependent on claim 1 and Pirrung does not disclose or suggest every feature recited in claim 1, Pirrung and Tanaka do not disclose or suggest every feature recited in claims 19–23.

2. The Examiner Has Not Provided a Proper Reason to Combine Pirrung and Tanaka

With respect to a reason to combine the references, for claims 19, 20, and 22, the Examiner states "for the purpose of good capacity to form homogeneous films and high sensitivities at a specific wavelength allowing efficient development." The Examiner has provided no evidence whatsoever of how forming "homogeneous films and high sensitivities at a specific wavelength allow[s] efficient development" of the "Nucleic Acid Reading and Analysis System" of Pirrung.

This reason to combine is completely unrelated either to the pending claims or the subject-matter of the references. Accordingly, the Examiner appears to be engaged in a completely *post-hoc* reconstruction of the claim elements. "If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457–58 (Fed. Cir. 1998). "A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning." *KSR Int'l v. Teleflex Inc.*, slip op. at 17, 550 U.S. ___ (2007).

3. The Doctrine of Design Choice Does Not Apply

With respect to claims 21 and 23, the Examiner relies on design choice, citing *In re Leshin*. In such a rejection, the Examiner must show an art recognized suitability of the material for its intended use. M.P.E.P. 2144.07. With respect to claim 21, the Examiner must at least show that one skilled in the art would understand that aniline or thiophene are useful in the radiation-sensitive polymer described in Tanaka. With respect to claim 23, the Examiner must at least show that benzyl bromide is useful as an initiator for the radiation-sensitive polymer. The Examiner has failed to make either showing.

Applicant submits that the Examiner has failed to establish a *prima facie* case of unpatentability for any of the appealed claims. At best, the Examiner is picking-and-choosing

prior art corollaries for individual features recited in the claims, using the claims themselves as a blueprint. Nothing in the cited references suggests the combinations of features recited in the appealed claims. In fact, the prior art "corollaries" for the individual claim features do not even individually meet the claim limitations. Accordingly, Applicant requests that the Board overturn the rejections and find the appealed claims allowable.

H. Conclusion

Because each of the outstanding rejections of the appealed claims is improper, Applicant requests that the Board find all appealed claims allowable over the references of record.

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VIII. CLAIMS APPENDIX

The following is a listing of the claims on appeal.

1. (Previously presented)A method for detecting a particle on a substrate, wherein the substrate is used in the fabrication of an integrated device, the method comprising:

contacting the integrated-device substrate with a monomer, wherein a particle that catalyzes the polymerization of the monomer is disposed on the substrate, and

detecting the particle using a particle counter.

2. (Original) The method of claim 1, wherein the particle counter detects a property selected from the group consisting of number of particles, sizes of the particles, positions of the particles, and combinations thereof.

3. (Original) The method of claim 1, wherein the particle counter is capable of detecting particles on both sides of the substrate without unmounting the substrate.

4. (Original) The method of claim 1, wherein the particle counter detects particles optically.

5. (Previously presented) The method of claim 4, wherein the particle counter is a laser scanner.

6. (Original) The method of claim 4, wherein the particle counter detects a property selected from the group consisting of absorbance, fluorescence, reflectance, refractive index, and polarization.

7. (Previously presented) The method of claim 1, wherein a composition of the particle is identified.

8. (Original) The method of claim 7, wherein the composition of the particle is identified by the polymerization rate of the monomer.

9. (Original) The method of claim 8, wherein the monomer is polymerized by a plurality of particle types.

10. (Original) The method of claim 8, further comprising repeating the contacting and detecting steps.

11. (Original) The method of claim 1, wherein the substrate is contacted with a plurality of monomers.

12. (Previously presented) The method of claim 11, wherein the plurality of monomers contact the substrate simultaneously.

13. (Previously presented) The method of claim 11, wherein the plurality of monomers contact the substrate sequentially.

14. (Original) The method of claim 1, wherein the particle is a metal.

15. (Original) The method of claim 14, wherein the metal is copper.

16. (Original) The method of claim 1, wherein the substrate comprises silicon.

17. (Original) The method of claim 16, wherein the substrate comprises a single crystal silicon wafer.

18. (Previously presented) The method of claim 1, wherein the monomer is in a vapor phase.

19. (Original) The method of claim 1, wherein the monomer is an alkene.

20. (Original) The method of claim 19, wherein the alkene is selected from the group consisting of styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and acrylonitrile.

21. (Original) The method of claim 1, wherein the monomer is selected from the group consisting of aniline and thiophene.

22. (Original) The method of claim 1, further comprising an initiator.

23. (Original) The method of claim 22, wherein the initiator is benzyl bromide.

24. (Original) The method of claim 1, wherein the substrate is irradiated with electromagnetic radiation.

IX. EVIDENCE APPENDIX

The following U.S. Patents are relied on as evidence in this appeal: U.S. Patent No. 6,646,243 (Pirrung); U.S. Patent No. 4,967,095 (Berger); U.S. Patent No. 4,965,454 (Yamauchi); U.S. Patent No. 6,485,703 (Coté); U.S. Patent No. 7,056,666 (Dower); and U.S. Patent No. 5,100,762 (Tanaka). Each of these references was first cited by the Examiner in an Office Action dated October 12, 2006.

X. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.

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